REMARKS

In view of the comments which follow, and pursuant to 37 C.F.R. § 1.111, reconsideration of the Official Action of January 10, 2005 is respectfully requested by Applicants.

Summary

Claims 1 – 18 stand rejected. Claims 1 – 18 are pending following entry of the remarks.

Rejections under 35 U.S.C. § 103

The Examiner has rejected Claims 1 – 3, 5 – 10, 12 – 14, and 16 - 17 under 35 U.S.C. § 103 (a) as being unpatentable over Mokbel et al. (Mokbel) (U.S. 5,905,969) in view of Im et al. (Im) (US 5,805,696). Applicants respectfully traverse these rejections.

To clarify the instant invention and support the remarks submitted herein in reply to the Examiner's claim rejections, Applicants submit a brief summary of one the disclosed embodiments. Thus, the claimed voice feature extraction device provides a noise reduction system coefficient that is obtained by adding a surrounding signal inputted from the microphone and a specific simulated voice signal, executing an adaptive control to the added signals to thereby calculate a filter coefficient, and applying a fast Fourier transform to the filter coefficient to thereby calculate the power spectrum vector.

Further, the claimed voice extraction device samples a voice signal inputted from another microphone, executes a Fast Fourier transform (FFT) to prevent generation of high frequency components of the input voice signal sampled, calculates a power spectrum vector of a power spectrum signal produced from the Fourier transformed input voice signal and then calculates the voice feature from the power spectrum vector via the noise reduction system that is set to the calculated noise reduction system coefficient.

Pending Claim 1 recites that a voice feature extraction device comprises a noise reduction system coefficient calculation unit that adds a simulated voice signal to a surrounding signal, and calculates a noise reduction system

coefficient of a noise reduction system.

The Examiner states that Mokbel discloses a noise reduction coefficient calculation unit that calculates adaptation filter parameters based on a Least Mean Square (LMS) error method between a reference signal and an input signal. In Mokbel, the adaptation filter parameters (coefficients) H(i) are computed from filtered elementary signals $V_n(i)$ with i = 1,..., N, and from a reference signal RS. Further, the filtered elementary signals $V_n(i)$ are outputs of a multiplier circuit or attenuator which combines the coefficients H(i) and elementary signals V(i). These elementary signals V(i) are resultant signals of an input signal s(n) subjected to an FFT process followed by a sub-band filtering process. Thus, the filter coefficients H(i) are adaptively generated from the reference signal RS and the FFT-processed and sub-band filtered input signal s(n). In contrast, the claimed noise reduction coefficients are generated from a simulated signal added to a surrounding signal. Applicants wish to point out that in Claim 1 the surrounding signal feature is distinguishable from the input signal feature. That is, the claimed noise reduction coefficients computation is executed using the surrounding signal rather than the input signal.

The Examiner further states that Mokbel discloses an input power calculation unit that calculates a power spectrum vector of a power spectrum signal from an input voice signal. Mokbel also discloses that the reference signal RS is submitted to a modulation, of the power modulation type, depending on the power of the digital telephone signal received s(n) (column 4, line 65, column 5, line 11, and FIG.2). Thus, the power spectrum vector of the input signal s(n) is applied to the power modulation of the reference signal RS. In contrast, as claimed, the noise reduction system that is set to the coefficient calculated by noise reduction system coefficient calculation unit executes a noise reduction processing on the power spectrum vector. Thus, as claimed, the power spectrum vector is applied to the generated noise reduction coefficient, instead of the reference signal RS.

Applicants submit that Mokbel and Im are both silent about a simulated voice signal being added to a surrounding signal in order to calculate a noise reduction system coefficient of a noise reduction system. The Examiner acknowledges that Mokbel fails to disclose this claimed signal addition feature, but advances that Im does teach it. Applicants respectfully disagree.

In fact, Im teaches away from this claimed signal addition feature. Im is directed to an echo cancellation adaptation technique. In Im, the training sequence generator generates a low level training sequence utilizing the a priori known signals so as to adapt an echo estimating filter in response to the low level training sequence. In addition, in Im the adaptive filter receives a control signal combining incoming signals and a training signal is obtained as their algebraic difference rather than their algebraic sum. In Im, an adder 28 provides to an adaptive estimating filter 20 a control signal equal to the algebraic difference between a training signal P(z) and a resulting signal T(z) of all incoming signals. In contrast, Applicants' filter coefficient calculation unit adds a surrounding voice signal and a simulated signal.

Hence, for at least the above discussed reasons, Mokbel and Im may not properly be combined to reject Claim 1 under 35 U.S.C. 103(a). Hence, Claim 1 is allowable. Dependent Claims 2, 3, and 5 – 7 are also allowable for at least the same reasons.

Applicants also submit that Mokbel and Im may not properly be combined to reject Claim 8 under 35 U.S.C. 103(a) because Mokbel and Im are silent about a simulated voice signal being added to a surrounding voice signal in order to calculate a noise reduction system coefficient of a noise reduction system. Mokbel and Im are also silent about a noise reduction system that is set to the coefficient calculated by the noise reduction system coefficient calculation unit, and executes a noise reduction processing on the power spectrum vector. As such, similar to the above Claim 1 discussion, Applicants respectfully submit that Claim 8 is patentable over Mokbel and Im, taken individually or in combination with each other. Dependent Claims 9 – 11 are also patentable for at least the same reasons.

Applicants also submit that Mokbel and Im may not properly be combined to reject Claim 12 under 35 U.S.C. 103(a) because Mokbel and Im are silent about the step of adding a simulated voice signal to a surrounding voice signal to calculate a noise reduction system coefficient of a noise reduction system or that this calculation is executed without involving an input voice signal. Mokbel and Im are also silent about a noise reduction system that is set to the coefficient calculated by the noise reduction system coefficient calculation unit that

executes a noise reduction processing on the power spectrum vector. As such, similar to the above Claim 1 discussion, Applicants respectfully submit that Claim 12 is patentable over Mokbel and Im, taken individually or in combination with each other. Dependent Claims 13 – 15 are also patentable for at least the same reasons.

Applicants also submit that Mokbel and Im may not properly be combined to reject Claim 16 under 35 U.S.C. 103(a) because Mokbel and Im are silent about the step of adding a simulated voice signal to a surrounding voice signal to calculate a noise reduction system coefficient of a noise reduction system or that this calculation is executed without involving an input voice signal. Mokbel and Im are also silent about the step of calculating a voice feature from the power spectrum vector via the noise reduction system that is set to the calculated noise reduction system coefficient. As such, similar to the above Claim 1 discussion, Applicants respectfully submit that Claim 16 is patentable over Mokbel and Im, taken individually or in combination with each other. Dependent Claim 17 is also patentable for at least the same reasons.

The Examiner has further rejected Claims 4, 11, 15 and 18 under 35 U.S.C. §103 (a) as being unpatentable over Mokbel in view of Im and further in view of Haykin et al. (Haykin) (U.S. 5,027,123). Applicants respectfully traverse these rejections.

Claims 4, 11 and 15 are either directly or indirectly dependent on Claims 1, 8 and 12, respectively. In the above discussions, Claims 1, 8 and 12 were shown to be allowable over a combination of Mokbel and Im. Applicants submit that in the Haykin reference, the specific gain adjustment is applied to both the Uhh(t) and the Dhh(t) signals instead of only the simulated signal as claimed in Claim 4, 11 and 15. Thus, Haykin fails to teach or disclose the corresponding features of Claims 4, 11 and 15. Therefore, Mokbel, Im and Haykin may not properly be combined to reject Claims 4, 11, and 15 under 35 U.S.C. 103(a).

As for Claim 18, Claim 18 recites that an adaptive filter executes an adaptive control on the basis of the signal added by the adder and the simulated voice signal delayed by the delay processing unit, and generates a filter coefficient; then an FFT operation unit that executes a fast Fourier transform to the filter coefficient generated by the adaptive control of the adaptive filter. In

contrast, Mokbel fails to disclose an FFT operation unit that executes a fast Fourier transform to a filter coefficient obtained by an adaptive control of the adaptive filter. As discussed above in relation to Claims 1 and 8, Mokbel and Im fail to teach an adaptive filter having the input voice signal and the simulated voice signal added as input. Still further, as discussed above in relation to Claims 4, 11 and 15, Haykin fails to teach that a specific gain adjustment is executed solely on the simulated voice signal. Therefore, Mokbel, Im and Haykin may not properly be combined to reject Claim 18 under 35 U.S.C. 103(a).

As such, Applicants respectfully request that the rejections of Claims 4, 11, 15 and 18 be withdrawn.

Conclusion

Applicants submit that this application is now in condition for allowance, and favorable reconsideration of this application in view of the above remarks is respectfully requested. If any fees are due, Applicant requests that this paper constitutes any necessary petition and authorizes the Commissioner to charge any underpayment, or credit any overpayment, to Deposit Account No. 23-1925.

If the Examiner still believes the application is not in condition for allowance, the Examiner is requested to telephone the undersigned attorney at the below listed number.

Respectfully submitted,
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